George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

ED27-ACU-FOP-011
BASELINE
2/9/00

# FACILITY OPERATING PROCEDURE

## ED27 / Vibration, Acoustics, and Shock Team

# B&K PULSE SYSTEM CALIBRATION

**CHECK THE MASTER LIST—**
**VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE**

| Status (Baseline / Revision / Canceled) | Document Revision | Document Date | Description |
|---|---|---|---|
| Baseline | | 2/9/00 | Document converted from ED73-ACU-FOP-011.<br>Organizational changes.<br>Reference document number changes. |
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## 1.0 INTRODUCTION

### 1.1 Scope

This procedure defines the step required to calibrate some Category V equipment used by the ED27 vibration laboratories.

### 1.2 Purpose

This document defines calibration procedures as required by MPG 8730.5.

### 1.3 Applicability

This procedure applies to the Bruel & Kjaer Pulse System. This version is intended to verify manufacturer's specifications for limited use.

## 2.0 DOCUMENTS

### 2.1 Applicable Documents

ED27-VIB-SOP-001 Control of Quality Records in Vibration East

### 2.2 Reference Documents

MPG 8730.5. Control of Inspection, Measuring, and Test Equipment

## 3.0 DEFINITIONS

None

## 4.0 INSTRUCTIONS

The following calibration/verification will be done once to verify the manufacturer's specifications for vibration measurements to 3200 Hz. and microphone measurements to 10K Hz. using the 10V input range and linear averaging. A subsequent version will be written to perform a complete calibration of the system. Results will be noted on Appendix A and filed as defined in ED27-VIB-SOP-001. Any out-of-tolerances will be adjusted or repaired before use and the procedure will be redone.

## 4.1 FREQUENCY RESPONSE FUNCTION VERIFICATION

4.1.1 Set the following measurement parameters;
Span: 3.2 KHz.
Lines: 800
Averages: 500 Linear
All channels to
10 V Max Peak Input
1V/V Sensitivity

4.1.2 Using Appendix A, Table 1, input a 1Vrms sine wave at each frequency and record the cursor ‘Total’ levels.

## 4.2 INPUT RANGE VERIFICATION

4.2.1 Using Appendix A, Table 2, vary the 1000 Hz. input signal level and the input range and record the cursor ‘Total’ levels.

## 4.3 CONSTANT PERCENTAGE BANDWITH VERIFICATION

4.3.1 Set the following measurement parameters;
Bandwith: 1/3 Oct 20 Hz -> 10K Hz
Averages: 30 Seconds
All channels to
10 V Max Peak Input
1V/Pa Sensitivity

4.3.2 Using Appendix A, Table 3, input a 1 Vrms sine wave at each frequency and record the cursor ‘Total levels.

## 4.4 INPUT RANGE VERIFCATION

4.4.1 Using Appendix A, Table 4, vary the 1000 Hz. input signal level and the input range and record the cursor ‘Total’ levels.

## 5. FORMS

None

## 6. QUALITY RECORDS

Appendix A - B&K Type 2133 Frequency Analyzer Calibration

Appendix A will be maintained as documented in ED27-VIB-SOP-001, Control of Quality Records in Vibration East.

## 7. NOTES

If conditions do not allow the input of the exact values called out in Appendix A, the values used should be noted in parenthesis and the expected values should be calculated by;

dB = 20 * log10 ( value used / 20e-6)

These values should be noted in parenthesis along with the actual readings.

Appendix A - B&K Type 2133 Frequency Analyzer Calibration

Analyzer under Calibration
Brand & Model _____ ECN _____

Voltmeter
Brand & Model _____ ECN _____
Calibration date _____

Frequency Counter
Brand & Model _____ ECN _____
Calibration date _____

| Freq. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 12.5 | | | | | | | | |
| 31.5 | | | | | | | | |
| 63 | | | | | | | | |
| 125 | | | | | | | | |
| 250 | | | | | | | | |
| 500 | | | | | | | | |
| 1000 | | | | | | | | |
| 2500 | | | | | | | | |

All readings should be 1.00 V +/- 0.2 dB
TABLE 1

| Input Range | Input voltage | Expected Value | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 10 V | 10.1 mV | 10.0 mV | | | | | | | | |
| 10V | 6.01 V | 6.01 V | | | | | | | | |

TABLE 2

| Freq. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 31.5 | | | | | | | | |
| 63 | | | | | | | | |
| 125 | | | | | | | | |
| 250 | | | | | | | | |
| 500 | | | | | | | | |
| 1000 | | | | | | | | |
| 2500 | | | | | | | | |
| 4000 | | | | | | | | |
| 8000 | | | | | | | | |

All readings should be 94 dB +/- 0.2 dB
TABLE 3

| Input Range | Input voltage (mV) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|
| 10 V | 10.1 | | | | | | | | |
| 10V | 6010 | | | | | | | | |

TABLE 4

Calibration performed by _____

Date _____